

## Analysis of N-Nitroso-diethanolamine (NDELA) in Cosmetics

Nitrosamines are chemical contaminants that could be present in food, pharmaceuticals, tobacco, toys and personal care products. They are classified as human carcinogens and limits are established for different products. Cosmetics containing more than 50 ug/kg of nitrosamines, including NDELA, are banned in European Union.

Analysis of NDELA by HPLC with photolysis and post-column derivatization has high specificity and sensitivity and allows for accurate quantification of NDELA in cosmetics and raw materials used in cosmetics. The procedure is described in Official Method DIN EN ISO 10130:2009. Pickering Laboratories' UVE™ photochemical reactor and Onyx PCX post-column derivatization system are uniquely suited for NDELA analysis.

### Method

#### Analytical Conditions

**Analytical Column:** Spherisorb ODS-2, 4.6 x 150 mm

**Guard Column:** Reversed-phase C<sub>18</sub>, 4.6 x 20 mm

**Temperature:** 30 °C

**Flow Rate:** 0.5 mL/min

**Mobile Phase:** 0.02 M Ammonium Acetate in water, pH 6.8

**Injection Volume:** 10 – 50 µL

#### Post-Column Conditions

**Post-Column System:** Onyx PCX, Pinnacle PCX or Vector PCX

**Photochemical Reactor:** UVE™

**Reactor Volume:** 1.0 mL

**Reactor Temperature:** 50 °C

**Reagent:** Dissolve 0.25 g of N-(1-naphthyl) ethylenediamine dihydrochloride in 250 mL of water. Dissolve 4.0 g of sulfanilamide in 250 mL of a 5% (w/v) aqueous solution of 85% orthophosphoric acid. Mix the reagents together in an amber glass bottle and keep the mixture away from light.

**Reagent Flow Rate:** 0.5 mL/min

**Detection:** UV/Vis 540 nm



Flow diagram for NDELA analysis according to  
DIN EN ISO 10130:2009

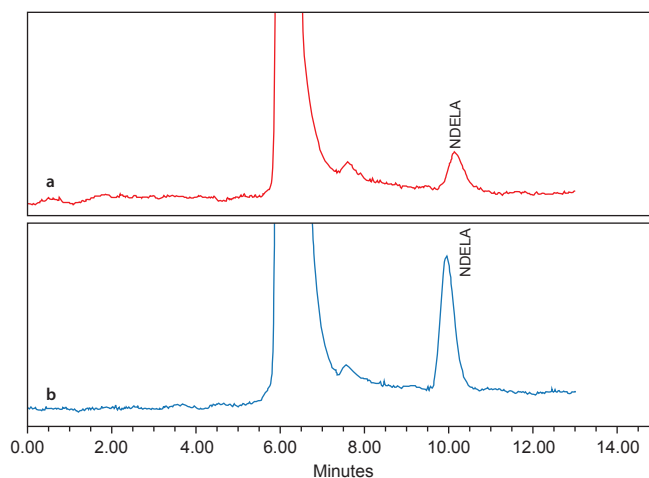


Fig 1. Chromatograms of NDELA standard: a. 4.8 ppb; b. 16 ppb

### References

1. DIN EN ISO 10130:2009

Cosmetics - Analytical methods - Nitrosamines: Detection and determination of N-nitrosodiethanolamine (NDELA) in cosmetics by HPLC, post-column photolysis and derivatization.

2. A method for the determination of N-Nitrosodiethanolamine (NDELA) in Personal Care Products – Collaboratively evaluated by the CTPA Nitrosamines Working Group: Chris Flower, Stephen Carter, Andy Earls, Richard Fowler, Stewart Hewlins, Sam Lalljie, Mark Lefebvre, Jacqueline Mavro, David Small, and Nathalie Volpe